e-ISSN: 2056-7421

Excavations by Gogar Church, Nether Gogar, Edinburgh

How to cite:
Will, B 2018 'Excavations by Gogar Church, Nether Gogar, Edinburgh', *Scottish Archaeological Internet Reports* 79
https://doi.org/10.9750/issn.2056-7421.2018.79

Visit http://archaeologydataservice.ac.uk/archives/view/sair to see the journal homepage

Excavations by Gogar Church, Nether Gogar, Edinburgh

Bob Will with Heather F James
with contributions by
Torben Ballin, Beverley Ballin Smith, Donal Bateson, Dennis Gallagher, Richard Jones,
Susan Ramsay and Catherine Smith

Address
GUARD Archaeology Ltd, 52 Elderpark Workspace, 100 Elderpark Street, Glasgow G51 3TR

Author contact
bob.will@guard-archaeology.co.uk

Funding
Edinburgh Tram Project for Edinburgh City Council

e-ISSN: 2056-7421
https://doi.org/10.9750/issn.2056-7421.2018.79
Published by the Society of Antiquaries of Scotland with the
Archaeology Data Service archaeologydataservice.ac.uk.

Society of Antiquaries of Scotland
National Museums Scotland
Chambers Street
Edinburgh EH1 1JF
United Kingdom

Managing editor: Catherine Aitken
Copy-editor: Susan Milligan
Production: Raspberry Creative Type, Edinburgh

www.socantscot.org
Registered Scottish charity no SC010440

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

A.1. APPENDIX: CHEMICAL AND PETROGRAPHIC ANALYSES OF MEDIEVAL SCOTTISH WHITE GRITTY WARE POTTERY

Richard Jones

A.1.1 Summary

As the medieval pottery assemblage was a potentially early and tightly dated group that consisted mainly of cooking pots and storage jars in Scottish White Gritty Ware fabrics (SWGW), the opportunity was taken to analyse the clay fabric by both chemical and petrographic means. The aim was to assess whether this pottery represented local or regional production. Since 1998 a project with a key element of science-based analysis has examined more than 600 Scottish White Gritty Ware sherds from over 40 sites throughout Scotland, including a large number from Edinburgh (Jones et al 2003; Haggarty & Hughes 2012). Since the initial study was published in 2003, further assemblages and sites have been analysed, including material from Norton House Hotel (Jones 2008) and Kirkliston Road, Newbridge (Jones 2011); both these sites are in located within 5km of Gogar Church.

A.1.2 Material

Twenty sherds were selected for chemical and petrographic analysis. The selected sherds consisted of 12 cooking pot rims, four cooking pot flat bases, two jug bases and two body sherds. The sherds, which are mostly from cooking pots, are illustrated in Illus 36 and 41 and described in Table 5 (although sherd 320 is represented, its small size precluded analysis). One of the rims (21) and a body sherd (363) were actually in a red fabric with a full white slip on the interior and exterior surfaces. The use of white slip on red fabrics is usually associated with material found in Perth and Stirling. Therefore these sherds were selected to determine whether they originated in the local Gogar area or from further afield.

A.1.2.1 Petrographic description

The thin sections were examined with a Leica Wild M240 polarising microscope. Maximum objective was ×32. Selected photomicrographs (taken in plane polarised light) appear in Illus 42; the horizontal field of view is *c* 8mm. Summary descriptions of all sherds subject to petrographic analysis are given below.

▸ SF18

Fabric: cream, uniformly fired.

Matrix: coarse, moderately sorted.

Voids: almost none.

- Inclusions:
- Very frequent scatter of very small and lath-like quartz, mostly *c* 0.06mm but going up to 0.12mm
- Occasional large sub-angular quartz typically 1mm, usually mono-crystalline but occasionally polycrystalline
- Five fragments of sandstone, ranging from 0.3mm to 1.7mm. Some of the smaller sandstone is disintegrating.
- No apparent igneous inclusions

Resembles 206.

▸ SF19

Fabric: light grey with prominent dark core.

Matrix: fine, moderately to poorly sorted.

Voids: few elongate.

Inclusions:

- Frequent small monocrystalline quartz, *c* 0.06mm
- Frequent large sub-angular quartz typically 0.6mm; one very large quartz grain 2.2mm
- Very distinctive are the long fibrous, laminated brown inclusions (Illus 42, arrow) up to 1.4mm
- No apparent igneous inclusions

▸ SF21

Fabric: light pale brown with dark grey core.

Matrix: coarse, moderately sorted.

Voids: almost none.

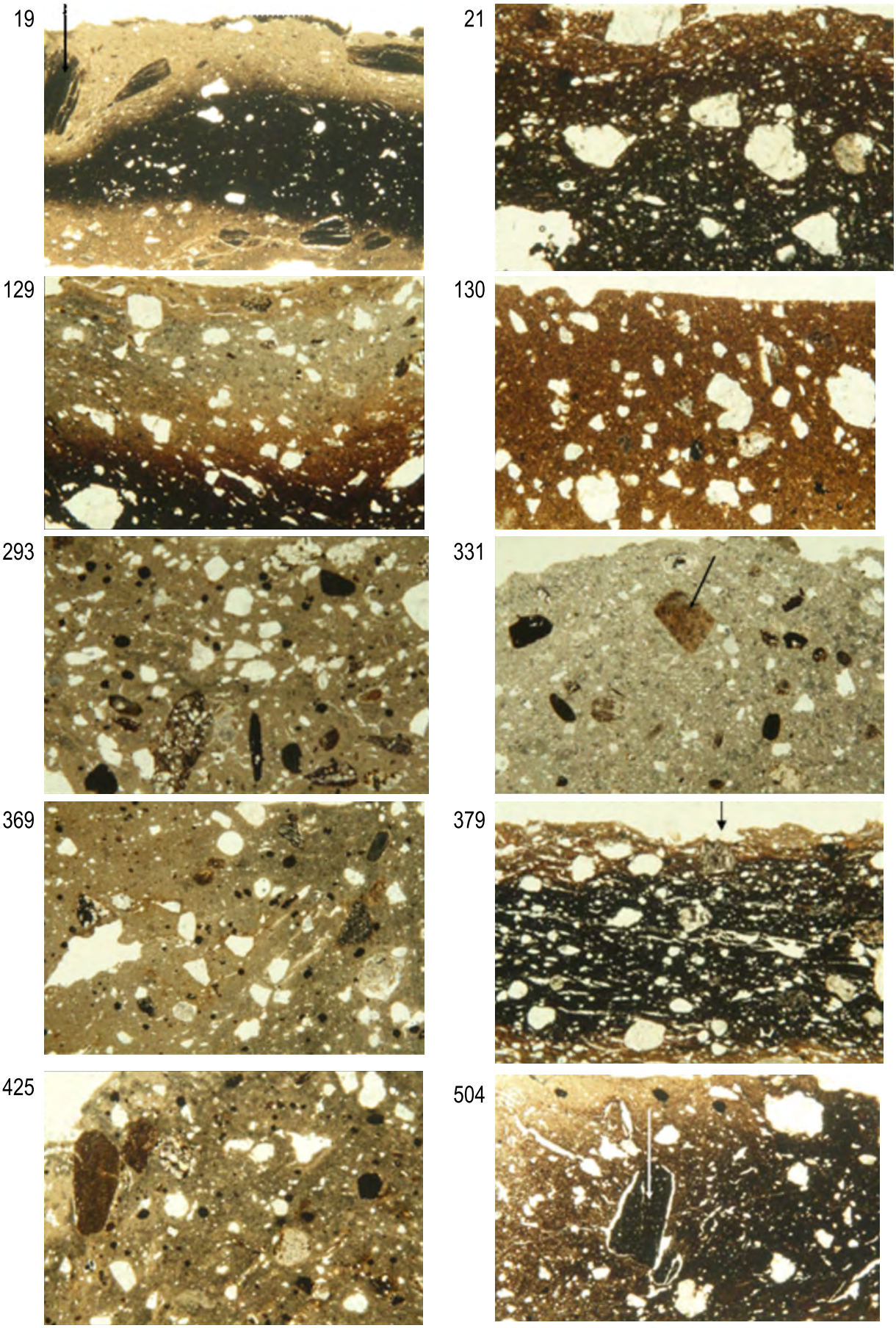
Inclusions:

- Very frequent small quartz up to 0.12mm
- Frequent quartz up to 0.25mm
- Less frequent or occasional angular quartz in 0.5–1.25mm range
- No apparent igneous inclusions

Table 5 Illustrated sherds and sherds used for scientific analysis (see Illus 36)

Sherd SF	Context	Description (* denotes scientific analysis)
		Medieval
25	2136	SWGW undecorated cooking pot rim, profile *
293	2009	SWGW undecorated cooking pot rim, profile *
320	2000	SWGW undecorated cooking pot rim, profile
387	2165	SWGW undecorated cooking pot rim, profile *
129	2006	SWGW cooking pot base with soot on underside *
379	2114	SWGW undecorated base *
425	2211	SWGW cooking pot base *
504	2278	SWGW undecorated base *
508	2348	SWGW cooking pot base with soot on underside *
206	2002	SWGW base with spots of green glaze and impressions of fingerprints on the inside *
18	2002	SWGW cooking pot rim *
19	2002	SWGW cooking pot rim *
21	2002	SMR cooking pot rim with white slip *
258	2064	SWGW cooking pot rim *
331	2114	SWGW cooking pot rim *
354	2114	SWGW cooking pot rim *
361	2133	SWGW cooking pot rim *
369	2114	SWGW cooking pot rim *
375	2114	SWGW cooking pot rim
475	2002	SWGW cooking pot rim *
130	2006	SMR body sherd with white slip – not illustrated *
363	2133	SWGW cooking pot body sherd – not illustrated *
		Post-medieval
66	2002	SPMRW profile of a grooved strap handle from a small jug
145	2028	SPMOW oval-shaped rod handle and rim from a small jug
414	2207	SPMRW green glazed jug rim
417	2207	SPMRW green/brown glazed jug rim with ridged cordon below the rim with part of a pulled spout
199	2002	SPMOW jug base with green glaze
402	2207	SPMRW jug base with thumbing round base copying Rhenish stonewares

Illus 41 Photograph of medieval pottery sherds selected for scientific analysis



Illus 42 Photomicrograph of Scottish White Gritty Ware fabric of sampled sherds

The distinctive feature is the frequency of quartz and its size ranges (Illus 42).

▸ SF25

Fabric: Cream brown with dark core extending all way to inner surface of rim.

Matrix: coarse, moderately sorted.

Voids: several small, elongate which may not be natural.

Inclusions:

- Frequent small quartz up to 0.12mm
- Frequent to very frequent angular to sub-angular quartz up to 1.2mm but more typically 0.6–0.7mm
- One distinctive brown inclusion – burnt clast?
- No apparent igneous fragments

Resembles 354 with respect to quartz size and frequency.

▸ SF129

Fabric: cream interior to grey-brown extending to exterior surface (Illus 42). Black base has a layer of heavy carbon residue, surprisingly unfriable and stable.

Matrix: fine, moderately sorted. Orientation of matrix clearly aligned with exterior surface in the grey-brown exterior, much less evident in interior.

Voids: very few natural voids; some may be due to plucking of quartz grains.

Inclusions:

- Frequent small inclusions up to 0.12mm
- Frequent larger quartz, some if polycrystalline typically 1mm, but one large quartz at 1.7mm
- Occasional sub-rounded ?igneous fragments up to 0.7mm
- Few opaques, some burnt clasts
- No mudstone/textural concentration feature

Generally similar to 508.

▸ SF130

Fabric: uniform red.

Matrix: fine, poorly sorted.

Voids: rare.

Inclusions:

- Few small quartz up to 0.12mm
- Frequent intermediate quartz in 0.5mm size range
- Frequent large quartz up to 1.2mm
- Few opaques
- Few burnt clasts
- Rare igneous

The red fabric and large quartz grains are distinctive (Illus 42).

▸ SF206

Fabric: cream, uniformly fired.

Matrix: fine.

Voids: few and small.

Inclusions:

- Very frequent, small quartz mostly 0.06mm but going up to 0.1mm
- Rare larger quartz up to 0.5mm
- Three sub-rounded igneous fragments, 1mm
- Rare burnt clasts, one of them 2mm
- Common fine mica laths

The fine texture fabric is the main feature.

▸ SF293

Fabric: cream, evenly fired.

Matrix: fine, poorly sorted.

Voids: few.

Inclusions:

- Few small quartz up to 0.12mm
- Frequent larger quartz up to 0.5mm
- Some large quartz at 2.5mm
- Occasional sandstone up to 1.1mm
- Few igneous inclusions, including basalt, sub-rounded variable size up to 2.5mm
- Some opaques typically 0.2mm, rounded but sometimes very elongate

The igneous fragments and the relatively low frequency of small quartz are distinctive in this sample (Illus 42).

▸ SF331

Fabric: cream, evenly fired.

Matrix: coarse, moderately sorted.

Voids: almost none.

Inclusions:

- Frequent small quartz up to 0.12mm
- Frequent large quartz up to 0.7mm
- Rare sandstone
- Igneous fragments of possibly three types, one of which is basalt, in the size range 0.2–1.2mm
- Occasional opaques and burnt clasts
- One nearly square-shaped brown-veined inclusion, probably mudstone (Illus 42 arrow), opaque on XPL

Similar to 387 in terms of the matrix.

▸ SF354

Fabric: cream to dark grey interior core.

Matrix: fine, poorly sorted.

Voids: few.

Inclusions:

- Quite frequent small quartz typically 0.06mm
- Frequent large quartz angular to sub-angular typically 0.6mm but going up to 1.5mm
- 1 large sandstone 2.5mm
- Rare opaques
- No apparent igneous

The large quartz grains are the distinctive feature.

▸ SF361

Fabric: dark grey core with narrow cream band interior and exterior.

Matrix: fine, moderately sorted.

Voids: several but probably all or most due to plucking of quartz grains.

Inclusions:

- Very frequent small quartz 0.06mm
- Frequent large sub-angular quartz 0.04–1.3mm
- Rare opaques; no burnt clasts
- No apparent igneous fragments

▸ SF369

Fabric: pale light brown, uniform.

Matrix: fine, poorly sorted.

Voids: few.

Inclusions:

- Frequent small quartz up to 0.12mm
- Frequent large angular quartz, typically 0.6mm but occasionally 1.2mm
- Frequent rounded opaques *c* 0.2mm
- Occasional igneous fragments of possibly three types but not including basalt

The diversity of inclusions is noteworthy (Illus 42).

▸ SF379

Fabric: thick grey brown core, very narrow cream exterior and interior. Oriented parallel to surface of vessel.

Matrix: coarse, poorly sorted.

Voids: many elongated probably due to plucking.

Inclusions:

- Frequent small quartz all monocrystalline up to 0.12mm
- Frequent larger quartz typically 0.5mm but sub-angular (1.2mm) to sub-rounded (0.7mm)
- Rare sandstone of size 0.7mm rising to 1.3mm
- Occasional sub-angular to sub-rounded igneous of at least two types in 0.8–1.0mm range; one may be basalt (Illus 42, arrow)

▸ SF387

Fabric: cream, uniform.

Matrix: fine moderately sorted.

Voids: rare.

Inclusions:

- Very frequent small rounded quartz up to 0.12mm
- Frequent larger sub-angular quartz, 0.4–1.3mm
- Rare igneous, probably basalt, 0.05mm
- No sandstone

▸ SF425

Fabric: cream uniform base. Finger impressions on interior of base.

Matrix: fine poorly sorted.

Voids: rare.

Inclusions:

- Occasional small quartz grains up to 0.12mm
- Occasional larger sub-angular quartz grains up to 0.4mm
- Occasional large angular, sub-angular and sub-rounded quartz in the range 0.7–1.3mm
- One large sandstone of size 1.5mm
- Frequent small rounded opaques, 0.12mm
- Rare fibrous elongate brown inclusions up to 2.5mm (Illus 42) – burnt clast?
- Several igneous inclusions of at least two types; most are 0.6–0.75mm but one is 1.5mm

Similar to 18 but rather coarser.

▸ SF504

Fabric: cream brown interior surface but thick dark grey core.

Matrix: Fine, poorly sorted.

Voids: few.

Inclusions:

- Very frequent small quartz. 0.05mm
- Frequent large sub-angular quartz, 0.4–1.3mm
- Few large brown angular fibrous laminated inclusions of ?siltstone/mudstone (Illus 42 arrow) as in 19
- Quite frequent opaques
- No apparent igneous fragments

The laminated angular inclusions are distinctive.

▸ SF508

Fabric: cream but darkish exterior core. Slight finger impressions on interior of base.

Matrix: fine poorly sorted. Darker (reduced) layer is notably more oriented to the surface of pot, like 379.

Voids: none.

Inclusions:

- Frequent small quartz up to 0.12mm
- Frequent larger quartz, some if polycrystalline *c* 0.5mm, but one large quartz grain at 1.75mm
- Common black opaques in two sizes: 0.12mm and 0.3–0.6mm
- Two large sub-rounded ?mudstone or textural concentration features, 1.0mm and 1.85mm
- One large sub-rounded quartz-rich igneous fragment, 1.2mm

A.1.2.2 Discussion

The first point to make about the compositions at Gogar is that they display the general material characteristics of SWGW, as for example Jones et al (2003) found among examples throughout Scotland: very frequent quartz grains occurring in a wide range of sizes (ibid: fig 42). With few exceptions, such as SF19 and SF331, the presence of larger-size quartz grains is indicative of deliberate tempering.

Some of the compositions share certain other features which include the presence of burnt clasts, siltstone and igneous rock fragments, but treated as a whole these compositions are not uniform and furthermore they defy ready classification into sub-groups. The immediate issue then is whether the level of variation observed is consistent with production at more than one centre.

Turning to the geological background, Gogar lies in a sedimentary environment of glacio-fluvial sands, gravels, till and sandstone – GFIC in Illus 43b – which also encompasses the till material making up the Cramond River valley (TillD in Illus 43b). In addition, there are outcrops of igneous rocks (1) ENE of Gogar at West Craigs (MVSC), (2) south of Ratho (MVSC), (3) to the north of the Cramond at West Craigie Farm and (4) at Corstophine (CRST). In the vicinity of Gogar clays would probably have been available along or near Gogar Burn and Gogar Loch to the east (where South Gyle is today; see Morrison et al 2009: illus 2). Small though the igneous presence at West Craigs is, its relative proximity to Gogar – *c* 1km – could in principle explain the finding of occasional igneous fragments in SF21, SF25, SF129, SF130, SF354, SF361, SF379 and SF508. In practice, however, it will be necessary to compare these fragments, which it is important to note are *not* all of the same type, with those principally making up the Midland Valley Sill complex (which will include basalt) – this has yet to be done.

Nevertheless the findings as they presently stand can make a case for *local* production of these eight samples but *not* at the same workshop. Since the general appearance and composition of these eight samples is not uniform, we could propose that they are products of neighbouring, local workshops (or, of course, of local workshops that operated at different time periods) and the same remark applies to the remaining samples from Gogar.

One alternative option is that they were products of workshop(s) to the west that were using clays close to the River Cramond. On geological grounds this is feasible and furthermore can be considered in the light of the results from Newbridge and Norton House Hotel. At the former site Jones (2011) found significant variation among the admittedly few (six) specimens examined, two of which contained igneous fragments. Their re-examination reveals that that lack of uniformity is shared at Gogar and furthermore some fabrics seem to appear at both sites. For instance, SF354 is similar to NB1 and NB5; SF369 is similar to NB2. On the other hand, there is somewhat greater uniformity among the samples from Norton House Hotel; the light-coloured oxidised fabric is quartz-rich but little or none of it is of large size, and igneous fragments seem to be absent.

A third option takes the source closer to the coast at Cramond. The intrusive rock outcrop at West Craigie Farm (Illus 43a, b) to the north of the river, which is of different geological character to the Midland Valley sill complex, is responsible for the igneous fragments in the fluvial deposits.

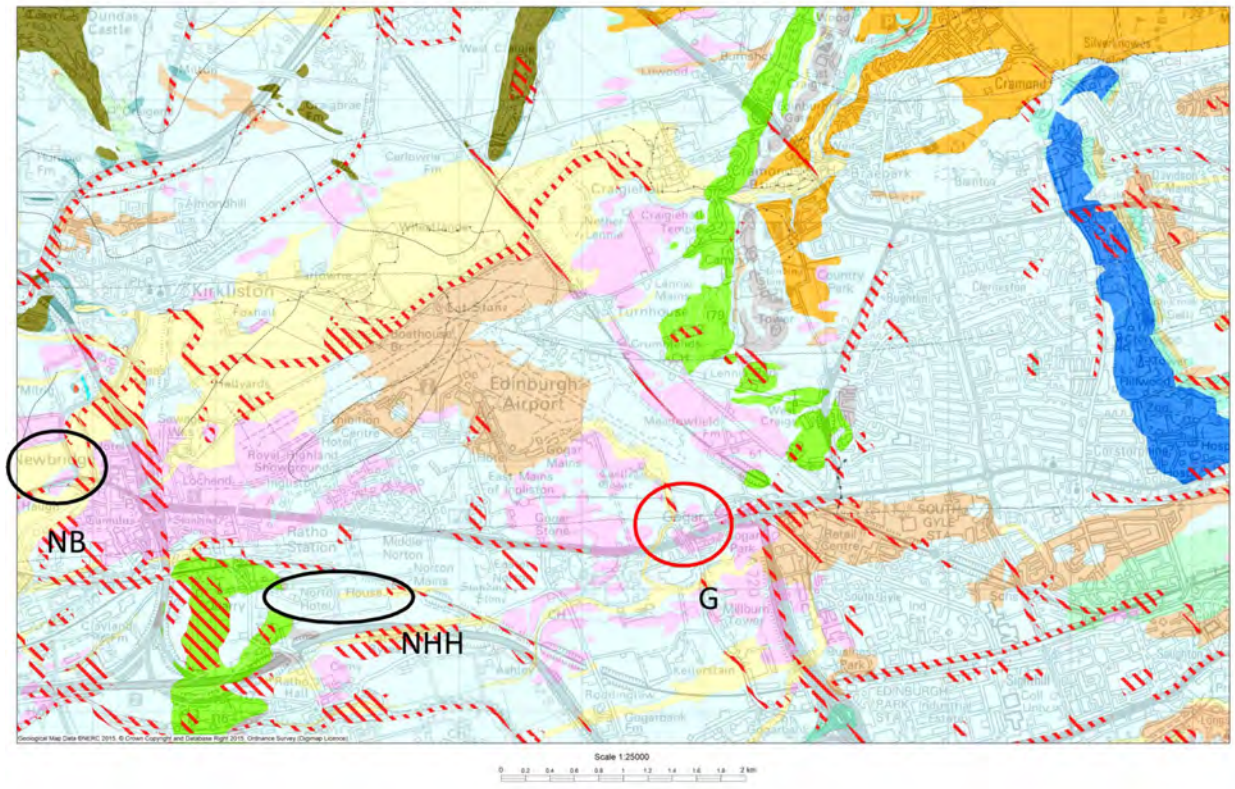
In summary, the petrographic data is pointing to multiple local production places for the SWGW at Gogar; possible candidates are (a) the immediate vicinity of Gogar, (b) several kilometres to the west near the River Cramond, and/or (c) to the north-west near Carlowrie Farm. These same places account for some or most of the SWGW found at Newbridge, but not at Norton House Hotel.

A.1.2.3 Chemical analysis

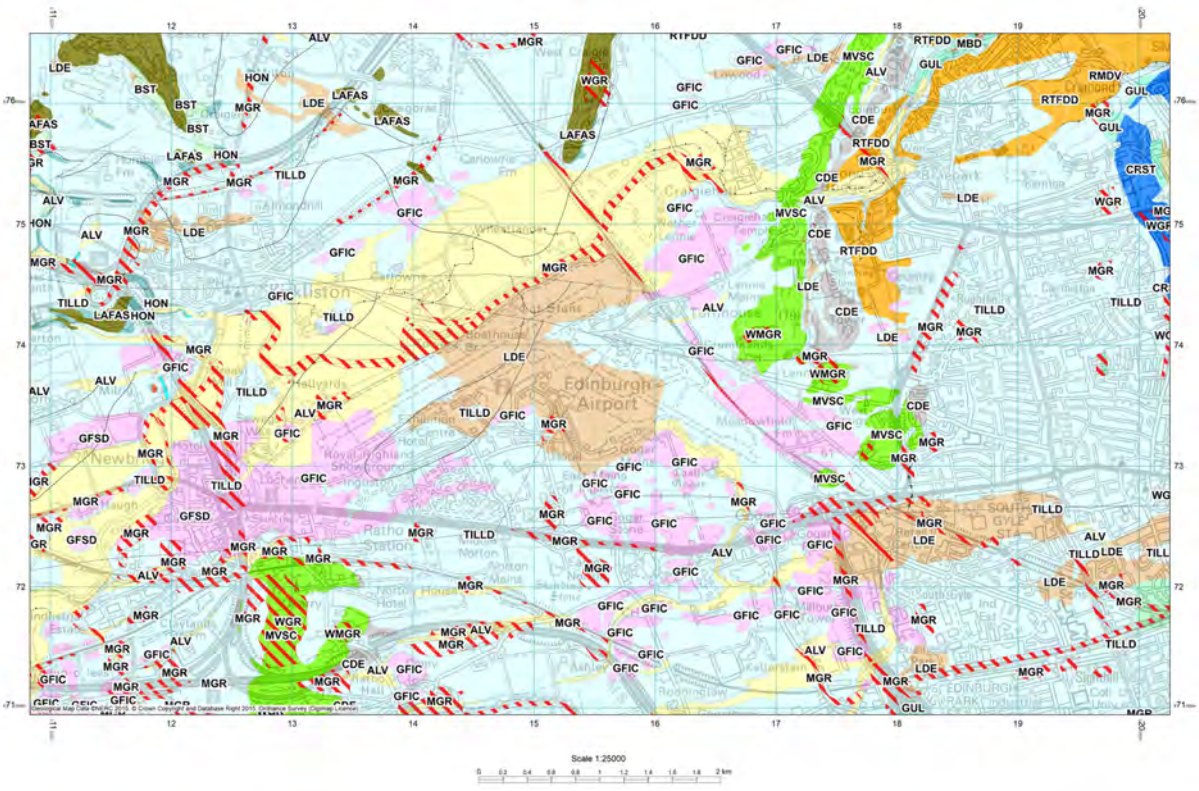
Chemical analysis of all samples, apart from SF129 and SF320, was carried out by inductively-coupled plasma emission (ICP-ES) and inductively-coupled plasma mass spectrometry (ICP-MS) in September 2011, using the same technique (for ICP-ES) and methodology as that described by Jones et al (2003). The samples together with standards were analysed at the Earth Sciences Department, Royal Holloway College, University of London, Egham. The composition data consisting of the concentrations of 19 elements (ICP-ES: Table 2 Al to Zr) and 13 elements (ICP-MS: Table 2 Cr to Pb) elements were treated using principal components analysis (PCA) and discriminant analysis (DA) in the SPSS PC package (v.22).

The compositions are typical of SWGW having high, variable Al and low Ca, Mg, Na and Mn contents. The iron (Fe) contents are also variable, as is clear in Illus 44. In keeping with the petrographic data, the compositions do not form a single compact group. The feature of high iron and low aluminium contents in SF130 together with its red fabric suggest that this sherd is better classified as a redware. SF379 has anomalously high lanthanide element and several high trace element contents; whether this can be explained by the higher than average igneous fragment content is uncertain, to say the least. Jugs 206 and 425 are no different in composition from the cooking pots, yet it is interesting to note that 425 together with 293, both containing igneous inclusions, form a pair chemically owing to their high iron content.

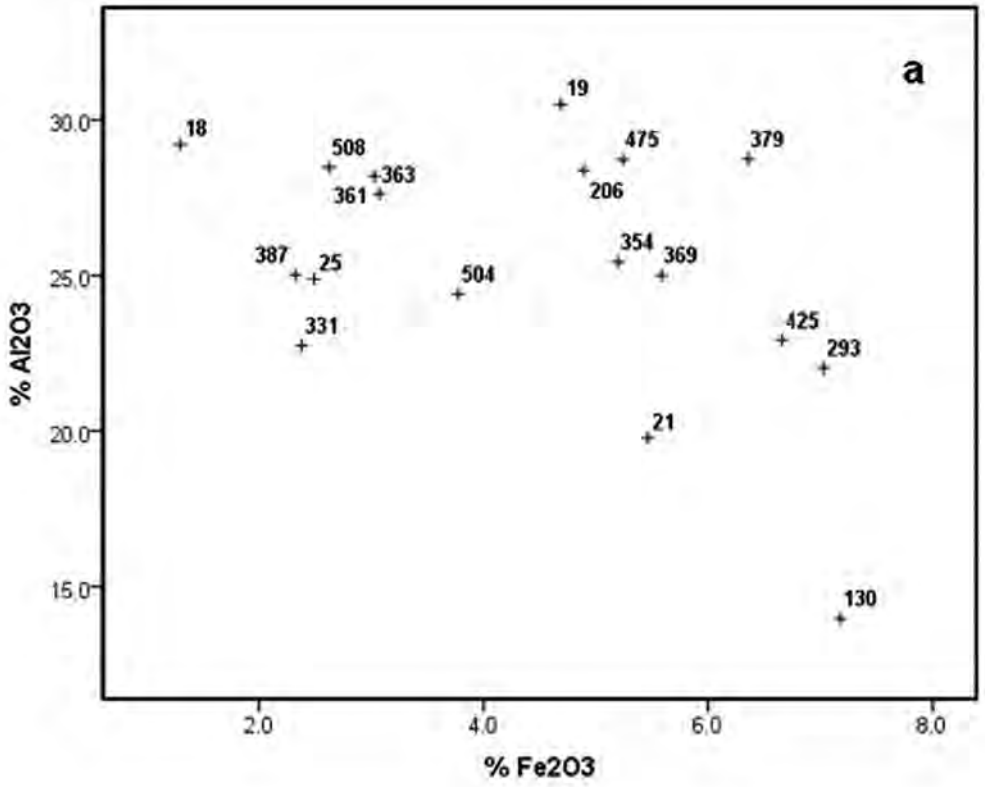
The hypothesis proposed in the previous section, of production at more than one location in the area, can be tested by comparing the compositions (excluding SF130 and SF379) with those at Newbridge and Norton House Hotel, bearing in mind that the compositions from those two locations are not numerous. The results of PCA in Illus 45 show that the SWGW at the Hotel site (apart from NHH8) separates from Newbridge and Gogar along PC2, but there is considerable overlap between the latter two sites. This situation is reflected more starkly in the output of DA (Illus 46), which treats the SWGW data as three separate groups: Gogar and Newbridge are again very close; although the two sites retain their separate identity, the distinction between them is very subtle, based as it is on the scores on the (weak) second discriminant function. Indeed, a more critical view of Illus 46 would argue that these two groups are chemically indistinguishable. The Hotel site, on the other hand, is well discriminated as is shown in Illus 46 & 47, where the Hotel site separates away from the other two.



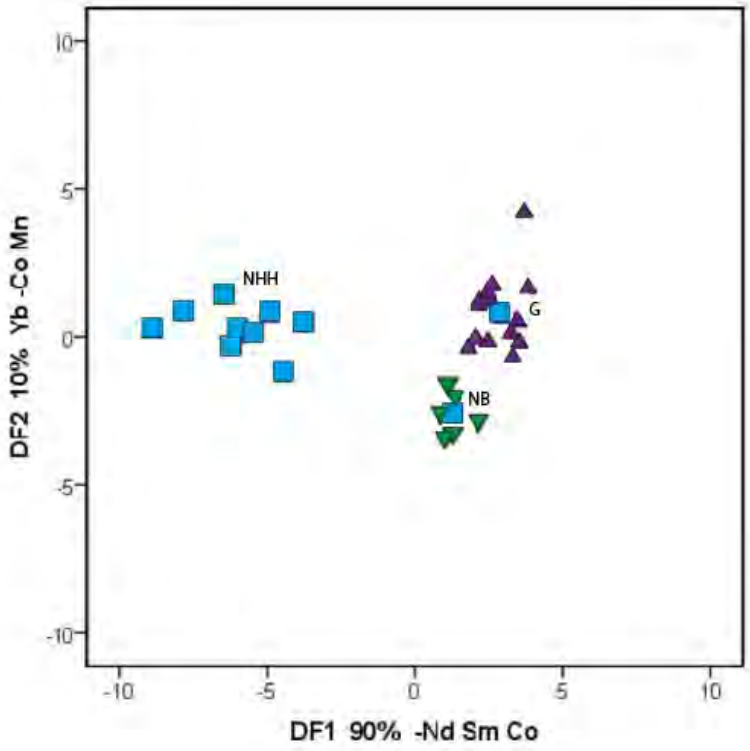
Illus 43a Geological map of the area west of Edinburgh showing Gogar (G), Norton House Hotel (NHH) and Newbridge (NB)



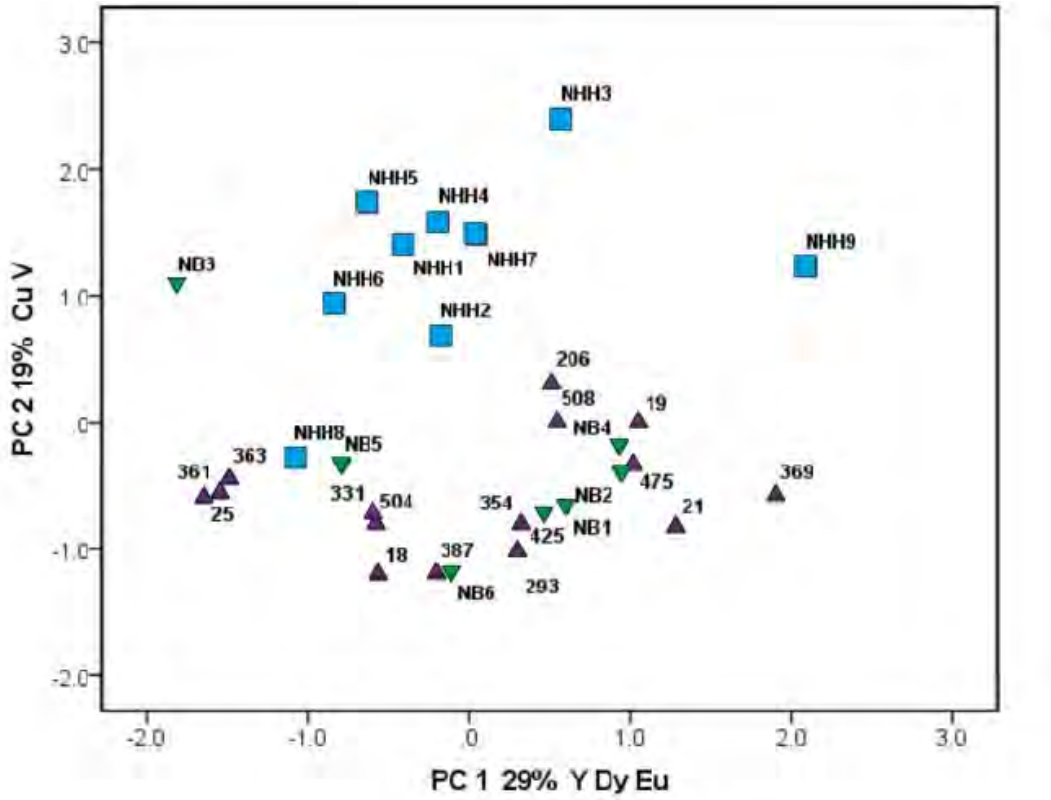
Illus 43b The geological map with annotation: LDE Lacustrine deposit; TillD Till Devensian; CRST Corstophine sill; WGR Worked ground; MGR Made ground; MVSC Midland Valley sill complex; GFIC Glaciofluvial ice contact deposit; LAFAS Dinantian to Westphalian sills of Lothians and Fife



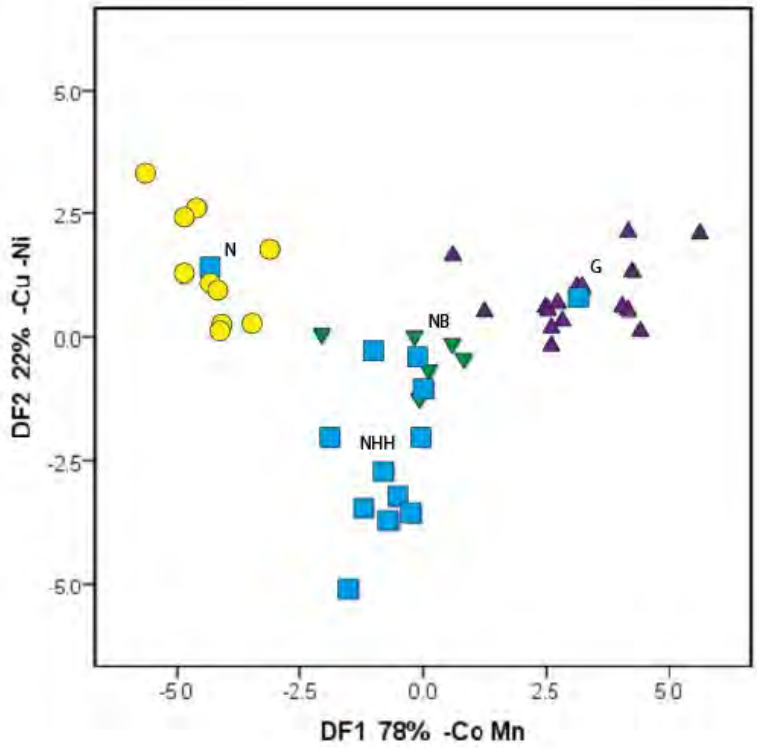
Illus 44 Plot of the aluminium and iron oxide contents



Illus 45 Principal component analysis: Gogar (excluding SF130 and SF379; purple triangle), Newbridge (NB, green inverted triangle) and Norton House Hotel (NHH, blue square) compositions (all elements, except P, Ba, Cd and As; raw form)



Illus 46 DA plot of the SWGW groups at Gogar (G, purple triangle), Newbridge (NB, green inverted triangle) and Norton House Hotel (NHH, blue square)



Illus 47 DA plot of the SWGW groups at Gogar, Newbridge, Norton House Hotel and Niddrie (N, yellow circles)

At this point the combined petrographic and chemical datasets suggest:

- The SWGW at Gogar is the product of more than one workshop in the local area.
- Gogar SF130 is probably a redware.
- Some of the SWGW at Gogar and Newbridge has a common source.
- The SWGW at the Norton House Hotel has a different but probably local source.

Looking further afield (Illus 47), these three sites can be discriminated from the SWGW found at Niddrie near Edinburgh, which has recently been analysed by the same technique (Haggarty & Hughes 2012); wherever the Niddrie material was made, it was not to the immediate west of Edinburgh.

A.1.2.4 Conclusion

Using the combined analytical techniques of petrographic and chemical analysis supplemented by an existing dataset from two other sites in the immediate area has produced similar and interesting results. Both techniques have identified common traits in the SWGW sherds which suggest that there were several local production centres in the area. In addition, there appears to be a local chemical signature for this area that can distinguish sherds from the different local production sites from pottery from the wider area in and around Edinburgh. Therefore the combined approach using the two techniques has demonstrated that it is possible to distinguish between sherds recovered in a small local area as well as over a large geographical area.

7. ACKNOWLEDGEMENTS

The authors would like to thank Sheen Smith and John Lawson from the City of Edinburgh Council and the fieldwork team whose efforts in often difficult conditions were appreciated. In addition we would like to thank Gert Petersen for preparing the petrographic thin sections. The illustrations were provided by Gillian McSwan, Fiona Jackson and Sarah Bailie.

8. REFERENCES

Addyman, T 2004 'Station Brae, Dreghorn (Dreghorn parish), Neolithic settlement with ?ritualistic component; medieval village', *Discovery and Excavation in Scotland* 5: 87–90.

Ballin, T B 2005 'Lithic artefacts and pottery from Townparks, Antrim Town', *Ulster Archaeological Journal* 64: 12–25.

Bishop, R R, Church, M J & Rowley-Conwy, P A 2009 'Cereals, fruits and nuts in the Scottish Neolithic', *Proc Soc Antiq Scot* 139: 47–103.

Brooks, C M 1980 'Medieval pottery from the kiln site at Colstoun, E Lothian', *Proc Soc Antiq Scot*, 110: 364–403.

Caldwell, D H & Dean, V E 1992 'The pottery industry at Throsk, Stirlingshire in the 17th and 18th century', *Post-Medieval Archaeology* 26: 1–47.

Cappers, R T J, Bekker, R M & Jans, J E A 2006 *Digital Seed Atlas of the Netherlands*, Groningen Archaeological Studies 4. Eelde: Barkhuis Publishing.

Dalland, M 2006 'Report on the Earthwork and Metal Detector Survey of Sections of the Proposed Route of the Edinburgh Tram Network between Gogar and Ingliston', Headland Internal report ETW05.

Dunbar, L & Engl, R 2016, 'A Roman Road Runs Through It: Excavations at Newbridge, Edinburgh', *Scottish Archaeological Internet Reports* 59 https://doi.org/10.9750/issn.1473-3803.2016.59

Engl, R & Hunter-Blair, A 2008 '2A Kirkliston Road, Newbridge, City of Edinburgh (Kirkliston parish), excavation', *Discovery and Excavation in Scotland* 9: 82.

Fenton, A 1999 *Scottish Country Life*. East Linton: Tuckwell Press.

Gibson, A 1989 'Medieval corn-drying kilns at Capo, Kincardineshire and Abercairny, Perthshire', *Proc Soc Antiq Scot* 118: 219–29.

Grainger, J D 1997 *Cromwell Against the Scots: The Last Anglo-Scottish War, 1650–1652*. East Linton: Tuckwell Press.

Haggarty, G 1980 'The pottery' *in* Ewart, G 'Excavations at Stirling Castle 1977–78', *Post-Medieval Archaeology* 14: 23–51 (36–46).

Haggarty, G & Hughes, M J 2012, 'The medieval and later pottery from Niddrie near Edinburgh', *Medieval Ceramics* 33: 53–71.

Haggarty, G, Hall, D & Chenery, S 2011 'Sourcing Scottish Redwares', Medieval Pottery Research Group Occasional Paper 5.

Hall, D W 1998 'The Scottish medieval pottery industry: a pilot study', *Tayside and Fife Archaeological Journal* 4: 170–8.

Hall, D 2004 'Excavations at the pottery production centre of Colstoun, East Lothian 1939, 1969, 1971, 1977 and 1999/2000', *Medieval Ceramics* 28: 35–74.

Hall, D W, Haggarty, G & Vince, A 2012 'The medieval pottery' *in Perth High Street Archaeological Excavations 1975–1977: The Ceramics, the Metalwork and the Wood, Fascicule 2*, Tayside and Fife Archaeological Committee Monograph Series 8: 3–73.

Hillman, G C 1981 'Reconstructing crop husbandry practices from charred remains of crops', *in* Mercer, R (ed.) *Farming Practice in British Prehistory*, 123–62. Edinburgh: Edinburgh University Press.

Howarth, S E and Williams, J T 1972 'Chrysanthemum segetum L.', *Journal of Ecology* 60: 573–84.

Hunter, F (2004) 'Birnie (Birnie parish), Iron Age and medieval settlement', *Discovery and Excavation in Scotland* 5: 84–5.

Jones, R E 2008 'A chemical and petrographic study of White Gritty pottery from Norton House Hotel and Blackfriars, Edinburgh: a preliminary report', unpublished report for GUARD.

Jones, R E 2011 'Chemical and petrographic analysis of White Gritty ware pottery at Kirkliston Road, Newbridge', unpublished report for AOC.

Jones, R E, Will, B, Haggarty, G & Hall, D 2003 'Sourcing Scottish White Gritty ware', *Medieval Ceramics* 26 & 27 (2002–3): 45–84.

Kinghorn, J & Quail, J 1986 *Delftfield: A Glasgow Pottery 1848–1823*. Glasgow: Glasgow Museums and Art Galleries.

MacAskill, N 1987 'The pottery' *in* Holdsworth, P (ed.) *Excavations in the Medieval Burgh of Perth 1979–1981*, 89–120. Edinburgh: Society of Antiquaries of Scotland Monograph Series 5.

MacGregor, G 1998 'Archaeological work on the Fife Water pipelines, 1995: The excavation of Bronze Age, Roman and medieval sites', *Tayside*

and Fife Archaeological Journal 4: 67–98.

Mitchell, S & Anderson, S 2011 'A rural medieval settlement and Early Iron Age funerary remains at Hallhill, Dunbar, East Lothian, Edinburgh', *Scottish Archaeological Internet Reports* 50. http://archaeologydataservice.ac.uk/archives/view/sair/contents.cfm?vol=50. Accessed 15 April 2015.

Morrison J, Oram, R & Ross, A 2009 'Gogar: archaeological and historical evidence for a lost medieval parish near Edinburgh', *Proc Soc Antiq Scot* 139: 229–55.

MPRG 1998 'A guide to the classification of medieval ceramic forms', Medieval Pottery Research Group Occasional Paper 1.

MPRG 2001 'Minimum standards for the processing, recording, analysis and publication of post-Roman ceramics', Medieval Pottery Research Group Occasional Paper 2.

RCAHMS 1929 *The Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. Tenth report with inventory of monuments and constructions in the counties of Midlothian and West Lothian*. Vol 27. Edinburgh: RCAHMS.

ScARF 2012 Hall, M & Price, N (eds) *Medieval Scotland: A Future for its Past*, Scottish Archaeological Research Framework: Society of Antiquaries of Scotland. Available online at http://www.scottishheritagehub.com/content/medieval. Accessed 4 July 2017.

Schweingruber, F H 1990 *Anatomy of European Woods.* Berne & Stuttgart: Haupt.

Smith, C 1998 'Dogs, cats and horses in the Scottish medieval town', *Proc Soc Antiq Scot* 128: 859–85.

Smith, C 2000 'The animal bone' *in* Perry, D R *Castle Park Dunbar: Two Thousand Years on a Fortified Headland*, 194–279. Edinburgh: Society of Antiquaries of Scotland Monograph Series 16.

Sneddon, D & Will, R 2006 'Edinburgh Tram Scheme Work Strands 3 and 4 Archaeological Evaluation. Data Structure Report', unpublished report for GUARD, Report 2235.

Stace, C 1997 *New Flora of the British Isles*, 2nd edn. Cambridge: Cambridge University Press.

Swan, D & Caruthers, M 2006 'Norton House Hotel, City of Edinburgh (Ratho parish): evaluation, excavation and watching brief'. *Discovery and Excavation in Scotland* 7: 77.

Tabraham, C 1984 'Excavations at Kelso Abbey', *Proc Soc Antiq Scot* 114: 365–404.

Williams, J T 1963 'Chenopodium album L.', *Journal of Ecology* 51: 711–25.